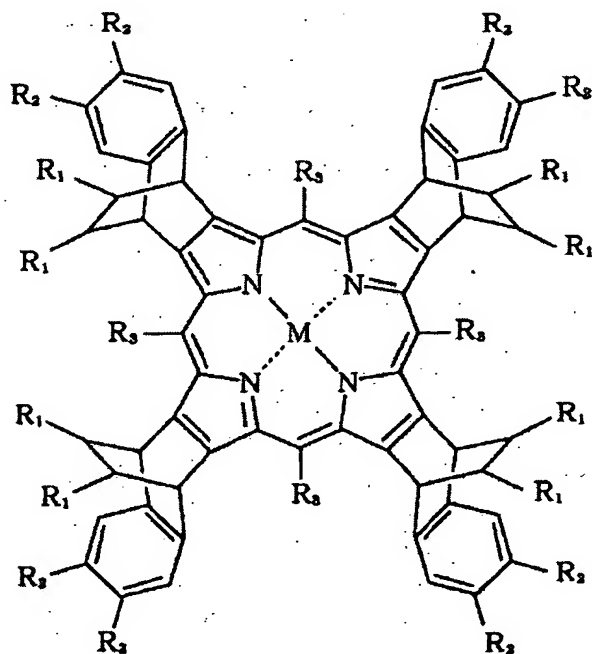


## CLAIMS

1. A method of producing a field effect transistor comprising an organic semiconductor layer,  
 5 comprising a step of heating a coating film comprising a porphyrin compound represented by general formula (1):

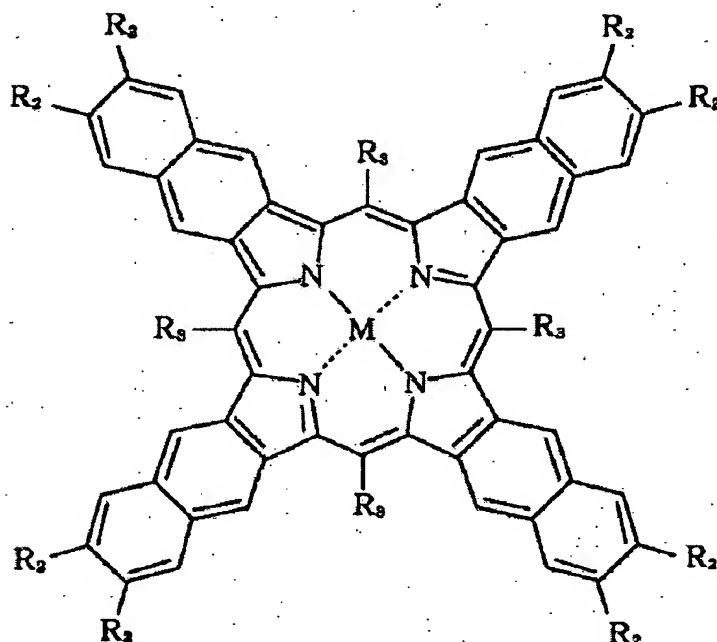
general formula (1)



- 10 wherein  $R_1$  and  $R_2$  each independently denote at least one selected from the group consisting of hydrogen, halogen, hydroxyl, and alkyl, oxyalkyl, thioalkyl and alkyl ester, each alkyl having 1 to 12 carbon atoms;  
 $R_3$  denotes at least one selected from the group  
 15 consisting of a hydrogen atom and an aryl group; and

M denotes two hydrogen atoms, a metal atom or a metal oxide;  
 to form as the organic semiconductor layer a  
 crystallized film of a porphyrin compound represented  
 5 by general formula (2):

general formula (2)

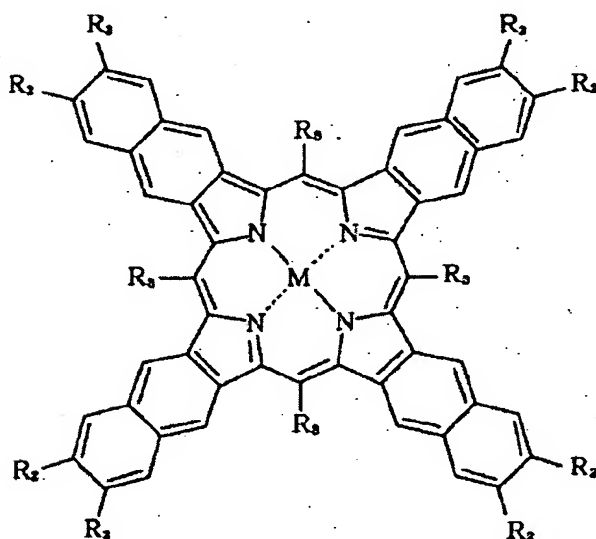


wherein  $R_2$ ,  $R_3$  and M each denote the same as defined above.

- 10        2. The method of producing a field effect transistor according to claim 1, wherein the coating film comprising the porphyrin compound represented by the general formula (1) is heated at a temperature range from 200 to 350°C to produce the compound of  
 15 the general formula (2) therefrom.

3. A field effect transistor comprising an organic semiconductor layer composed of a crystallized film of a naphthoporphyrin compound represented by general formula (2):

5            general formula (2)



wherein  $R_1$  and  $R_2$  each independently denote at least one selected from the group consisting of hydrogen, halogen, hydroxyl, and alkyl; oxyalkyl, thioalkyl and alkyl ester, each alkyl having 1 to 12 carbon atoms;  $R_3$  denotes at least one selected from the group consisting of a hydrogen atom and an aryl group; and M denotes two hydrogen atoms, a metal atom or a metal oxide,

15            wherein the crystallized film has crystal grains having a maximum diameter of 1  $\mu\text{m}$  or more.

4. The field effect transistor according to

claim 3, wherein the organic semiconductor layer comprised of the naphthoporphyrin compound represented by the general formula (2) has a strong absorption at 650 nm or longer.

5           5. The field effect transistor according to claim 3 or 4, wherein in the naphthoporphyrin compound represented by the general formula (2),  $R_2$  is a hydrogen atom.

10           6. The field effect transistor according to claim 3, wherein in the naphthoporphyrin compound represented by general formula (2),  $R_3$  is a hydrogen atom.

15           7. The field effect transistor according to claim 3, wherein in the naphthoporphyrin compound represented by general formula (2), M represents two hydrogen atoms.

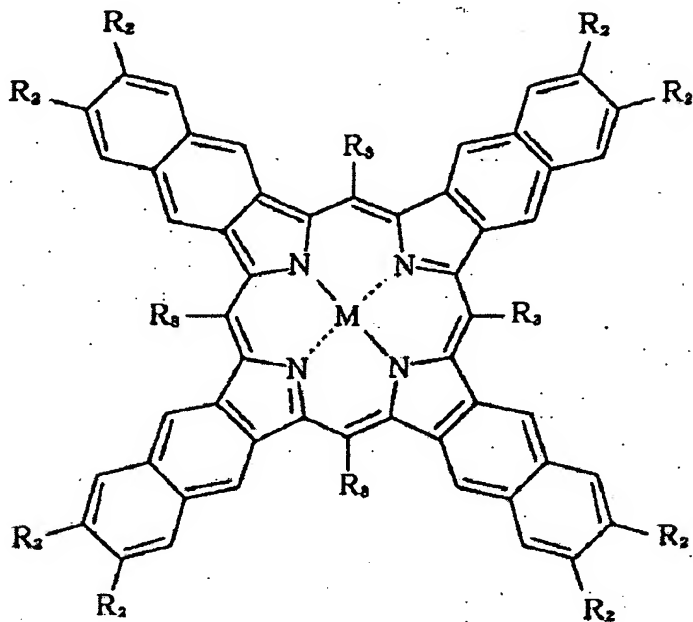
20           8. The field effect transistor according to claim 3, wherein in the naphthoporphyrin compound represented by general formula (2), M represents one copper atom.

            9. The field effect transistor according to claim 3, wherein the organic semiconductor layer has a field effect mobility of  $1 \times 10^{-3} \text{ cm}^2/\text{V}\cdot\text{s}$  or more and an On/Off ratio of 100 or more.

25           10. A field effect transistor comprising an organic semiconductor layer composed of a crystallized layer of a naphthoporphyrin compound

represented by general formula (2):

general formula (2)



wherein R<sub>1</sub> and R<sub>2</sub> each independently denote at least  
 5 one selected from the group consisting of hydrogen,  
 halogen, hydroxyl and alkyl, oxyalkyl, thioalkyl and  
 alkyl ester, each alkyl those having 1 to 12 carbon  
 atoms; R<sub>3</sub> denotes at least one selected from the  
 group consisting of a hydrogen atom and an aryl  
 10 group; and M denotes two hydrogen atoms, a metal atom  
 or a metal oxide,

wherein the crystallized film has a strong  
 absorption at 650 nm or longer.